vector update is complete and verified. You can have the computer back in block. Over.

SC Roger. ...9 number 102.

CAPCOM Roger, Bill.

SC All Helmut Kuehnel kitchen time is pretty nice.

CAPCOM Roger, Bill. You can turn off your H2 heaters now.

SC Wilco.

PAO Apollo Control, Houston. As you heard we sent a load to the onboard computer to update this state vector. This was sent and verified. Also, that was Jim Lovell along with Bill Anders. Jim indicating that they had narrowed their pericynthion through additional NAV sightings down to 66.8 nautical miles. Bill Anders in obviously very good spirits as you heard through the course of that conversation. At 46 hours, 45 minutes, 5 seconds into the flight, this is Apollo Control Houston.

END OF TAPE

PAO This is Apollo Control Houston at 46 hours 53 minutes 58 seconds into the flight. Our current altitude of Apollo 8 is 158,873.2 (accurate) nautical miles. The current velocity 3627.9 feet-per-second. We've received a status report from the crew and we'll pass this along now.

CAP COM Bill, we show you 168,000 (note discrepancy) out and we're getting - still getting pretty good high bit rate off the 30 foot ditches.

SC Okay. I'm in narrow beam high gain now. Were you getting that high bit rate on the omni.

CAP COM That's affirmative. We're back on high gain now.

SC Okay number one O2 is off and will you clarify your previous statement, were you getting good high bit rate while we were on the omnis about 10 minutes ago. Over.

CAP COM Apollo 8, Houston. That's affirmative. We were getting fairly good high bit rate with a little bit of noise.

SC Okay. Thank you.

CAP COM Roger. We only got two things left to do now; your crew status report and a redundant component check.

SC Okay, Jim will give you the latter - er former and I'll give you the latter.

CAP COM Okay. Bill, EECOM says thanks for the good job of keeping the omni's moving.

SC Roger. We'll make any sacrifice as long as they keep an eye on the systems.

CAP COM Wilco.

SC Who's on the watch with you?

CAP COM It's just me right now.

SC How about EECOM?

CAP COM Well, we have Clint. The Black Watch is watching.

SC Okay, stay alert.

CAP COM Roger, the Black Watch is watching.

SC Roger, I'll stay alert.
Okay Houston, here comes the status report.

CAP COM Roger, we're ready to copy.

SC Roger. For sleep, each of us has had two sleep periods, Frank's in his third one right now. Bill had six hours the last time, I had four hours the last time. Good to fair, both of us. Frank had five hours the last time, of fair. And Frank, of course, is sleeping now.

CAP COM Roger, Jim. How are the three of you feeling?

SC Wonderful. We're all feeling pretty good now, no problems. We've all had about between 40 and 60 ounces of - or clicks of water so far today.

CAP COM Okay.

SC The food, we're up to - we've eaten day two meal two so far and both of us have eaten three hydratables and the juices and about half of the solids.

CAP COM Roger, copy.

SC The cabin's running slightly cold, we do have one cabin fan on and we're in full heat and it's running just slightly under 70. Might get designed on for future spacecraft.

CAP COM Roger, Jim. That fan pretty noisy?

SC It's not as noisy as most fans when they're running; we cut it down to one fan.

CAP COM Roger. We keep thinking we hear it when your talking to us.

SC I wouldn't be a bit surprised.

Houston, we're showing a glycol evap out temp around 44 and a RAD out temp of about 28, I wonder if we might try some manual mixing it would raise the glycol evap amp temp out a little bit?

CAP COM Roger, Bill. Stand by.

SC Okay, Houston, secondary loop is coming up.

CAP COM Roger, Bill.

SC Okay, we're boiling the secondary evap and the temperatures stabilized and so we're gonna close up the back pressure valve.

CAP COM Roger, copy. Apollo 8, Houston.

SC Go ahead, Houston.

CAP COM Roger, Bill. Before you try the manual mixing, we'd like you to give it a whirl at the manual and increase on the cabin temp. Over.

SC We've done that. We're in full HOT and what is your - what's the lowest RAD out - individual RAD out temp you see there in your PTC?

CAP COM Roger, stand by. Apollo 8, this is Houston. We saw 26 one time.

SC Roger, understand. Plus 26.

CAP COM Affirmative. Apollo 8, Houston. Go ahead with your manual mixing. Suggest you set your evap out at about 55. Over.

SC Okay, we'll give that a try and let us hope the RAD out temps get ...

CAP COM Roger. We're monitoring.

PAO This is Apollo Control Houston. We now read ground elapsed time of 47 hours. Perhaps its good to

PAO point out again that as we examine the data in the early hours of this morning, we chose not to do the mid-course correction burn at ground elapsed time of 47 hours. The reason we chose not to do this, the data indicated that the burn would be in the magnitude of about one foot-per-second. This would be followed by a water dump which would have some perturbation on the trajectory and it appeared wise to pass this one by. So at 47 hours one minute now, this is Apollo Control Houston.

END OF TAPE

PAO This is Apollo Control Houston at 47 hours 25 minutes now into the flight of Apollo 8. Apollo 8 now showing a velocity of 3603.1 feet per second. Current altitude just under 160 000 nautical miles. 159 968.9 nautical miles. We have a short strip of conversation with the crew and we will play that now.

SC Houston. Apollo 8.

CAP COM Apollo 8. Houston. Go.

SC Roger, we have it stabilized about 53 degrees and we will leave it there, but we will go back AUTO if you start having any concern about the radiators.

CAP COM Roger Bill. We are showing 514 now.

SC Okay.

CAP COM Apollo 8. This is Houston. We are going to have a command changeover to Honeysuckle in about 2 minutes. Over.

SC Roger. Houston. Standing by.

CAP COM Apollo 8. Houston. That was Honeysuckle to Madrid.

SC Si, senor. Good by, you chaps.

SC Houston. Apollo 8.

CAP COM Apollo 8. Houston. Go.

SC Roger, did you delete the cislunar NAV exercise at 4715?

CAP COM That's affirmative and we added the extrá star sightings to the 145.

PAO Apollo Control Houston. That concludes our latest conversation with the crew. At the present time in Mission Control Center, some members of the Green Team are beginning to arrive. We will have a change of shift within the next hour. And during the Green Team's time aboard, we will cross that great divide in space. At 55 hours 30 minutes, about 8 hours from now. Where, for the first time, in manned space flight, the earth's sphere of influence will be secondary to another celestial body. Apollo 8 will enter the moon's sphere at about 55 hours 30 minutes. At this time the attraction of the moon becomes greater than the attraction of the earth. Our display references here in Mission Control will also have the capability of following suit. We will probably show such tings as altitude and velocity relative to the moon. At 47 hours 28 minutes 25 seconds into the flight, this is Apollo Control Houston.

END OF TAPE

PAO This is Apollo control Houston at 47 hours 43 minutes 53 seconds into the flight of Apollo 8. Our current altitude reading 160 thousand 614 nautical miles. Current velocity in feet per second 35 hundred 88 feet per second. We've had additional conversation with the crew and we'll pass that along now.

SC Houston. Apollo 8. Are you reading?

CAP COM Apollo 8 this is Houston. Buenos dias muchachas.

SC Buenos dias. I'm going to be answering your callls pretty quietly for a little while here to let the CDR get to sleep if you can't hear us, why --

CAP COM OK

SC Houston Apollo 8

CAP COM Apollo 8 Houston go.

CAP COM Apollo 8 Houston go.

SC Roger. My two cohorts are going to try and get some sleep here so y'all might keep a good eye on the systems I'm going to be moving over to the other side.

CAP COM Roger. Apollo 8 Houston we're getting low bitrate now, we could do better with a high-gain antenna before you move over to the other side. Over.

SC Houston Apollo 8

CAP COM Apollo 8 Houston go.

SC You might just give me a call every now and then, Jerry. Just let me know you're still there. As we're switching antennas, or play some music, or something.

CAPCOM Say again, Bill, you're kind of garbled.

SC Just give me a call every now and then as we switch antennas, just to let me know you're still there. Play some music or something, just to make sure we haven't lost contact.

CAPCOM Okay, Bill. Your antennas are looking good now. Hey, Bill, if you want music, I'll have Mike sing.

SC Get him to sing "Anchors Aweigh", will you?

CAPCOM This is Apollo Control, Houston, you no doubt gleaned from that last comment when Jerry Carr offerred a musical rendition by the oncoming CAPCOM, Mike Collins, Mike just walked into the room a few moments ago, he will take over duty as capsule communicator shortly. So at 47 hours 46 minutes 50 seconds into the flight of Apollo 8, this is Apollo Control, Houston.

END OF TAPE

PAO This is Apollo Control Houston, 48 hours 30 minutes into the flight. The Green team, the Green launch team has come on watch here in the Control Center, and Flight Director Clift Charlesworth is going around the room, console to console, getting a status report. The only little minor problem we have uncovered here, in this round robin and from discussions from the previous shift, is the suspicion cast that the secondary coolant loop, it may not be closing properly, and a procedure was passed to the crew to take a look at that. All else seems to be quite normal. We have some brief conversation backed up and we will play that for you now.

CAPCOM Apollo 8, Houston.

SC Roger.

CAPCOM -- or your secondary coolant loop looks like your backpressure valve might be slightly open. I suggest you go to secondary coolant loop EVAP switch to the reset position for 15 seconds. Over.

SC Roger. I did that again, I'll try it a third time.

CAPCOM Okay.

SC It didn't do any good, Houston.

CAPCOM Roger, Bill.

SC Keep an eye on it, in case it starts dropping. It stabilized there right after I set the evaporator on.

CAPCOM Roger, we will watch it.

SC What might have happened - Jim might have gotten the water control valve off before we completely had the backpressure valve closed.

CAPCOM Roger. Understand Jim turned the water control valve off.

SC Roger. We have the secondary water evap control valve off but he might have gotten it off on that return pump short check prior to the time the evaporator backpressure valve had completely closed, which might explain the lower than nominal pressure.

CAPCOM Roger, understand.

CAPCOM Apollo 8, Houston. Over.

SC Go ahead.

CAPCOM Roger, Bill. We see your secondary steam pressure coming back up slowly and we would like to just sit and watch it for a while before doing anything else.

SC Okay.

PAO This is Apollo Control Houston. We are

standing by, or estimating that the press conference from the previous shift should begin, the change of shift briefing, in approximately 8 minutes, shooting for 7:30 Houston time. We want to alert all press people to that fact. While that tape was playing, we did hear an analysis of - from the Surgeon's console, and they said while they felt the crew was doing better with their little medical probelms of yesterday, they didn't feel like they were completely out of the woods yet. They note that they are behind on water and they are apparently behind on sleep. They are also don't - not eating as much as they planned. But generally they are pleased that the situation is an improvement over yesterday morning. At 48 hours 33 minutes and 162,320 miles from earth, this is Apollo Control Houston.

END OF TAPE

PAO This is Apollo control, Houston and at 49 hours 18 minutes, we've just tagged up with the crew and Mike Collins is reading the morning addition of the Interstellar Times. Here's how it's going.

CAPCOM Apollo 8, Houston. Apollo 8, this is Houston, over.

SC Go ahead, Houston, Apollo 8.

CAPCOM Roger, I just wanted to let you know we still have voice contact and we have the morning news for you, we can give it to you now or sometime later, your choice.

SC How about right now.

CAPCOM Very good. This is the twenty third edition of the Interstellar Times via Paul Haney. We would like to let you know that there are only two more shopping days until Christmas. He says your TV transmission was a real big hit yesterday, Mickey Herskowitz is doing double duty for the Post, he's has written a couple of columns on your launch in addition to his other sports columns and Jim your mom certainly appreciated that birthday greeting. Twenty-one convicts broke out of a prison in New Orleans yesterday and President Johnson went home last night from the Naval hospital after his bout with the flu. He sends you guys a special message - not what to do for the flu but congratulations on the flight - the midwest, I don't know if you can see that from up there or not and then in Houston as a matter of fact, it's getting pretty chilly about 35 degrees and we would like to know who you like next Sunday, Baltimore or Cleveland. Baltimore defense looked pretty tremendous yesterday, they put on a great pass rush and in fact the capcom like Haney is trying to con you guys into a bet. Over.

SC I like Baltimore. How are the families doing, Mike.

CAPCOM They are doing just great, Bill, just talking to Valerie a few minutes ago.

SC That was Frank.

CAPCOM Oh, well, likewise, with Susan I have not talked to her since last night.

PAO Apollo control here, we got a little low on the conversation that may be resumed, we will take advantage of the lull to give you the altitude which is 163 920 miles and our velocity, 3514 feet per second, if you take three-fourths of that you can get the distance in miles per hour - I'll read that - it's something like 26 - 26 hundred miles per hour, call it. We'll stand by, here is more conversation.

SC Good sleep, yesterday.

CAPCOM Roger, thank you, Mike, we were wondering about that, about 5 hours of good sleep.

SC Right.

CAPCOM How is everything going up there, Frank, all three of you guys feeling okay this morning.

SC Feel fine, Jim went back to sleep though and I have had breakfast and everything seems fine.

CAPCOM Good, glad to hear it.

PAO This is Apollo control here, apparently we are wrapping up, the crew is now eating and we doubt that we will get any additional conversation for at least the next few minutes, the eat period extends up to 50 hours elasped. We are in 49 hours 29 minutes. The spacecraft meanwhile has - it's about to complete its second - let's back off that statement and put it this way. The Earth is about to complete its second revolution under the spacecraft. The spacecraft now in relation to the Earth is over Africa and that is its second revolution since the second rev when suddenly the spacecraft left the Earth out over the central Pacific. Our flat map projection follows this trace and it's running at about 10 degrees south latitude very steady and coming back across, if for map purposes it appears that it's coming - going from east to west across the face of the map. Of course, the spacecraft is quite steady and the Earth is turning under it. At 49 hours 30 minutes into the flight this is Apollo control, Houston.

END OF TAPE

PAO This is Apollo Control Houston here, 50 hours, 11 minutes into the flight. We have just established contact with Apollo 8 and here is how the conversation is going.

CAPCOM Apollo 8, Houston, over.

SC Go ahead Houston.

CAPCOM Just checking in with you after about a 45 minute quiet break. Say, we notice on your high-gain antenna, if you like you can get a little bit more use out it by switching to it from an OMNI when you have a yaw angle of 90 degrees, and a pitch angle of minus 45 degrees. We are noticing that you are staying an extra 10 minutes on the OMNI, which is fine; but you could get more use of high-gain, if you use that procedure, over.

SC Okay, thank you Houston. As long as the OMNI isn't working, we've got it all wrapped up here on the 8 ball with the roll ... pointing to an OMNI number, we just switch it, it makes it alot easier, if it is not bothering you.

CAPCOM Okay, that is fine. We are presently happy with the contact, we are just trying to be helpful.

SC Thank you very much. It's very unusual that Mike Collins is trying to be helpful, but never the less thank you very much.

CAPCOM (Garble)

SC Say hello to Howard Tindall for us will you, his procedure seemed to be working.

CAPCOM Sure will.

SC I hope that you have got everybody looking this thing over very carefully. One thing we want is a perfect spacecraft before we can consider the LOI burn.

CAPCOM Apollo 8, Houston, we concurr and we are doing that.

SC Okay. And Houston, Apollo 8, the water is in the process of being chlorinated at this time.

CAPCOM Apollo 8, Houston, over.

SC Go ahead.

CAPCOM At your convenience, we would like the readout of your Service Module SPS propellent quantities. We haven't gotten one of those so far this flight.

SC Standby, we are just about to - need to change the antenna. I'll get it.

CAPCOM Go ahead Apollo 8.

SC Okay, A, Service Module A, you ready.

CAPCOM Ready to copy.

SC The temperature is about 111, the helium pressure - do you just want the quantity or the whole works?

CAPCOM Well, if you are reading, give us the whole works.

SC Okay, the helium pressure is about 37, the manifold is 182, and the quantity is reading 80. B has got the temperature about 112, the helium pressure of 36, the fuel pressure 180, and the quanity about 77. C has got the temperature of 140, incidentally, those other temperatures should have been 120 instead of 110, I was looking at the wrong calibration here. The pressure is 37, the manifold fuel pressure is about 182 and the quantity is 80. Temperature on D is 115, pressure is 137, the manifold pressure is 181, and the quantity is about 83.

CAPCOM Roger, Frank, I read you loud and clear. On the temperatures, quad A and B should both be 120, Roger.

SC Roger.

CAPCOM Thank you.

SC 365 - I will trade all of that good information for a readout of the actual quantity, if you will give us a minute we will go ahead and plot them up, Mike.

CAPCOM Roger, we will standby until we get them for you.

CAPCOM Apollo 8, Houston, I have your Service Module RCS quantities available, over.

SC Roger, we are ready to copy at 50 hours, 16 minutes.

CAPCOM Okay, I have them both in percent and pounds, I'll give you both numbers. The pounds are slightly more accurate for plotting on your chart. Quad A 72 percent, 219 pounds; Quad B, 76 percent, 233 pounds; Quad C, 70 -.

SC Take it a little slower Mike, whoa, whoa, whoa, whoa.

CAPCOM Okay.

SC Slow up, we just got Quad A plotted. They are on operate tracks.

CAPCOM Okay.

SC Okay for Quad B.

CAPCOM Quad B, 76 percent, 233 pounds.

SC Okay, Quad C.

CAPCOM 76 percent, 231 pounds.

SC Quad D.

CAPCOM 76 percent, 229 pounds.

SC Okay. Would you give us the O2 and H2 as long as we are plotting?

CAPCOM Roger, standby for O2 and H2.

CAPCOM Apollo 8, Houston, we have got those numbers in a percent, we are going to switch them over to pounds; and in the meantime, we are going to be changing our ground antenna in about another 2 and 1/2 minutes you can expect a comm glitch, over.

SC Thank you.

CAPCOM Apollo 8, Houston, over.

SC Go ahead Houston, Apollo 8.
CAPCOM Roger, I have your oxygen and hydrogen quantities whenever you are ready to copy.
SC Ready.
CAPCOM Oxygen tank number 1, 270 pounds. Oxygen tank number 2, 267 pounds. Over.
SC Roger, thank you.
CAPCOM Roger, on the hydrogen, hydrogen tank number 1, 19.7. Hydrogen tank number 2, 20.1, over.
SC Understand 19.7 and 20.1.
CAPCOM Roger, you are a little bit low on the line on your graphs, but due to the fact that they started out low.
SC Roger.
PAO This is Apollo Control. We have apparently got a lull in the conversation. We have been listening to the exchange between Mike Collins and Apollo 8 live now, for nearly half an hour. Our present position relation to Earth, is 166 116 miles from Earth. Our velocity in feet per second, 3466. And one-fourth of that would be about 27 - 2725 miles per hour. Velocity will continue to slow down to a value of 2170 miles per hour, not feet per second. And at the point of lunar capture, or the point of lunar spere influence, which we are rapidly approaching; and infact reach, I believe at 55 hours. We will begin to see a slight acelleration. I think the biggest thing that we will experience today, at least we will be filling in numbers in an unknown but at a predicted area, is the range of temperatures that the spacecraft will be seeing. The Earth - even in Earth orbit, the Earth exerts a temperature factor over spacecraft, even out at 100 or more miles. And the Moon, it's theorized, does the same thing because of its highly reflective quality. The area between the Earth and the Moon has no great reflector available. And, thus, a different temperature regime is experienced. This will be of considerable interest to the spacecraft builders and the spacecraft thermal planners, as we progress through this day. At 50 hours, 27 minutes, this is Apollo Control Houston.

END OF TAPE

PAO This is Apollo Control Houston 50 hours 55 minutes into the flight. Mike Collins just put in a - I take that back. Apollo 8 just gave us a call a few minutes ago, I guess just to check and make sure our antennas are all switched around, which I believe they have been. We can expect some communication very shortly. We have had a number of calls on conversion charts. We would like to pass on to you these conversion tables. Earlier we had estimated that to get a handy grab on statute miles per hour, simply take 3/4 of feet per second. Of course, the number is somewhere between 3/4 and 2/3, so here are some more exacting tables. Before we do that, let's go now live to the communication.

CAPCOM - the block data you have onboard is satisfactory, over.

SC Understand. The block data we have aboard is satisfactory.

CAPCOM Roger. As for the flyby and pericynthion + 2 hour block update, we would like also to get a current up to date report on all your windows. We are trying to make some alternate plans for using the center hatch window when you are in lunar orbit and we would like to make sure we understand exactly what the condition of all five windows is. Over.

SC Okay. Window number 1 and window number 5 are clouded but may be partially useful. The hatch window is very heavily clouded. Windows number 2 and 4 are good.

CAPCOM Okay. Understand the hatch window is unusable, 1 and 5 are partially usable, and the rendezvous windows are both good.

SC Right.

CAPCOM Okay.

PAO Apollo Control here. We will take advantage here to go ahead and give you these conversion tables that we talked about earlier. If you have feet per second and you want statute miles per hour, you convert by multiplying feet per second times .6818. The resulting number statute miles per hour. If you want knots, you take feet per second, and multiply by .5925, I repeat, feet per second times .5925 gives you knots per hour. If you want kilometers per hour, you take feet per second and multiply by 1.097, 1.097, and you get kilometers per hour. And one other factor to help, particularly our European, well to help all reporters who are other than U.S., if you have statute miles per hour and multiply by 1.609, you can get

kilometers per hour. So much for the lack of a universal numbering system. We will go back and monitor the circuit now any additional communications.

PAO Apollo Control here. CAPCOM Mike Collins is sitting back in his seat and apparently we will not have any communication unless it is initiated by Apollo 8. So we will take the line down now at 51 hours even into the flight and we are - they are 167,000 miles from earth, moving at a velocity of 3441 feet per second. This is Apollo Control Houston.

END OF TAPE

PAO This is Apollo Control Houston 51 hours 41 minutes into the flight and just a very few minutes ago, the wife of Bill Anders, Valerie Anders, joined us here in the Control Center. She is seated in the viewing area, which overlooks the Mission Operations Control Room, chatting with Mr. James C. Elms, the director of the Electronics Research Center in Boston and Elms was formerly deputy director of this Manned Spacecraft Center. With her also is Neil Armstrong, backup command pilot for Apollo 8. This is the first of the wives to visit the Control Center during the mission. Later today we expect to see Jim Lovell's wife, Marilyn. In the course of the past 20 to 25 minutes we have backed up some conversation with Apollo 8, and are prepared to play it for you now.

CAPCOM Apollo 8, Houston. Over.

SC Go ahead, Houston. Apollo 8.

CAPCOM Roger, Frank. We would like to ask you about the next few hours in the flight plan. We are inclined to let Jim go ahead and sleep and to slip the P-23 that occurs at 5215. On the other, we would think it would probably be a good idea if he returned more to the normal sleep rest cycle and if you got him up nominally to do the 5215 work, then perhaps he would be ready to go back to sleep at about 61 hours, when he is nominally expected to do so.

SC Okay, he's up now, eating. We are planning to go to normal procedures on the flight plan.

CAPCOM Okay, that's fine then. If there is - you know, it's not time critical that P-23 be done at 5215, but if you get up to do it then, that's just fine.

SC Well, we thought we might give it a try.

CAPCOM Roger.

SC This sleep cycle here is - we are just going to have to real time it I guess, because I'm supposed to be asleep right now but obviously - I'm supposed to go to sleep here shortly but I just got up. We are have to play this by ear.

CAPCOM Roger, understand.

SC Houston, Apollo 8.

CAPCOM Go ahead, Apollo 8.

SC Are the stars in the flight plan proper for this next exercise, P-23?

CAPCOM We would like to talk to Jim about it when he is ready to copy.

SC He's ready.

CAPCOM Okay.

SC Good morning, Mike. How are you doing?

CAPCOM Fine, fine, Jim. You are sounding good this morning. We would like to give you a little rundown on these stars. As you can see in the flight plan, we've got you scheduled for a number 33, Antares, number 34, Atria, and number 40, old Altair. Now the first of those, Antares, is in plane, the second two are out of plane. As you know, we would like to get a mixture of the in and the out of plane. Antares, number 33, is closer to the sun, and we expect if you are going to have difficulty getting those measurements on number 33, we would like very much for you to try, but if you are unable to do number 33, then we propose that you use number 42, which is Peacock, to the lunar far horizon. We realize Peacock isn't the greatest one available, greatest star in the sky, but it's about the only one available. Over.

SC Roger, understand. I'll - we will go to Antares first and try it. You know, we tried it last time, but I got one set before I lost moon completely in the white haze. I'll give it another try and if it doesn't work out, we will go to Peacock and give it -

CAPCOM That is affirmative, Jim and if neither Antares nor Peacock work, well then, we just - we will be happy to go with Atria and with Altair. We would like them to increase the number of sets and do three on Atria, that is number 34, and two on Altair, number 40. But that is only in the event that you can get neither Antares nor Peacock. Apollo 8, Houston. Did you copy?

SC Roger, this is 8, copied. --- 34 to 3 and the number set of 40 to two if we cannot get 33 or 42.

CAPCOM That is exactly right.

PAO This is Apollo Control Houston. That cleans up our backlog of tape at this point. One item on new conference scene for the next several shifts, we plan a news conference today, or this afternoon, at approximately 3:15 pm Houston time. That will be 15 minutes after the change of shift for this afternoon. We will plan a news conference tonight at 11:15, at that shift break and tomorrow morning at 9:30 am. All times are Central standard, Houston time, 3:15 this afternoon, 11:15 tonight, and 9:30 tomorrow morning. Our distance right now 168,829 miles, we should - we are to pass into the lunar sphere of influence 55 hours 38 minutes, about 4 hours from now. Our velocity has slowed down to 3408 miles. While we were talking, Mike Collins has put in another call. Let's go back to that.

CAPCOM - and on this P-23 where it's rough to get our data, you are going to have to delay the DSKY display about 10 seconds when it comes up with NOUN 87, over.

SC Roger.
CAPCOM Apollo 8, Houston. We are past that 87 display now. Did you write down what your trunnion bias was?
SC Negative. Houston, we haven't started 23 yet. Our cal is zero.
CAPCOM Roger, understand. Thank you.
SC We are in the process now to do a - to go to P-23 auto -
CAPCOM Roger, thank you.
PAO And this is Apollo Control Houston. That apparently wraps it up for now. We are 51 hours 50 minutes into the flight.

END OF TAPE

PAO This is Apollo Control, Houston, 52 hours 21 minutes into the flight. We have a little tape backed up from the last twenty minute time period since we talked to you. We will play that for you. Very shortly we expect to query the crew on their medical status. We have had some communication regarding the system status. That is reported to be in excellent shape. Dr. Berry, and his people on the medical console are wondering about the water intake and the food intake which seems to be off. We don't understand the sleep cycle. The crew are grabbing naps or better when they can. We don't have a very good plot of just how much sleep each man has had. So he has prepared a list of questions which I think will be relayed to the crew within the hour. I believe that brings us up to date. Let's play the tape now, and we may, if the conversation resumes, come in with that.

CAPCOM Apollo 8, Houston.

SC Go ahead Houston, Apollo 8.

CAPCOM Roger. Our downlink data shows that on stars 33, Jim is using the lunar far horizon when he should be using the lunar near horizon. Over.

SC Okay. Thank you. 220?

CAPCOM Roger. 220.

SC Let's change it.

CAPCOM Roger.

SC Do you want the far horizon now, Houston?

CAPCOM Roger. Far horizon.

SC We have far horizon in now, Mike on 220. I will check again though.

CAPCOM Yes. That is right. We are requesting the lunar near horizon as per the flight plan. The lunar near horizon. We show that you are using the lunar far horizon.

SC Okay. Roger. I thought that you had copied up 220 to me. I will move to the near horizon.

CAPCOM Roger.

SC Houston, Apollo 8. Over.

CAPCOM Apollo 8, Houston. Go ahead.

SC ... We're getting a play-back, Mike. It is getting kind of damp in here. It might be a good idea to go back into AUTO on the temp in -- the glycol temp in for awhile to try and get some of this moisture out of the cabin.

capcom Roger. Stand by, Bill.

SC Roger.

CAPCOM Apollo 8, Houston.
SC Go ahead.
CAPCOM We concur. We would like you to go back to AUTO on the glycol temp inlet valve.
SC Okay. What was our lowest radiator out temp during the last couple of hours while we have had it in MANUAL?
CAPCOM I will get it for you.
SC And we are back in AUTO.
CAPCOM Roger. Back in AUTO. Twenty-nine degrees is as low as we sink.
SC Okay. We are showing a cabin temp of about 75. It is very comfortable, but we are getting a lot of condensation on the walls now.
CAPCOM Roger. Understand.
SC Houston, Apollo 8.
CAPCOM Apollo 8 this is Houston.
SC Roger. Mike, while we are waiting for the spacecraft to maneuver into the moon, I might note that as we get closer to the moon, the light from the sun comes right into the scanning telescope, and it is impossible to use. You have to rely on the sextant alone.
CAPCOM Roger, Jim. Understand that light from the sun is coming into the scanning telescope making it impossible to use, and you have to rely on the sextant alone. Can you attach any angle to that?
SC Well, Mike, I am right now on the substellar plane of 30 degrees. I don't know where the sun is exactly from there, but that is about the angle. We're -- the optics are pointed right at the moon now.
CAPCOM Roger. Understand. Apollo 8, Houston. We are going to be changing our antennas in a couple of minutes. You can expect COMM ...
SC Thank you.
SC Houston, Apollo 8. Over.
CAPCOM Apollo 8, Houston. Over.
SC Roger. The LMP is going to take a little snooze here for a while. I am wondering, can you give me a quick -- your view of the system status here before I depart, and also, give me an idea of when the next cryo stir is due.
CAPCOM Apollo 8, Houston.
SC Go ahead.
CAPCOM Roger. Your systems remain unchanged. They are all looking go. You can go ahead and stir up the cryo starting right now.
SC Okay. Will do.

CAPCOM ...Jim makes his next mark could he call up verb one noun one. We missed the last trunnion. Over.

SC Roger. The last trunnion was 10660.

CAPCOM 10660. Thank you.

CAPCOM Apollo 8, Houston.

SC Go Ahead.

CAPCOM Roger.Before Bill gets his snooze we would like him to give us a PRD readout on all three crew members. Over.

SC Roger. CDR is .06, CMP is ...

SC Okay Houston, We got three sets on 33, we are going now to 34 lunar far horizon for one set. Don't you agree?

CAPCOM We agree. Star 34 lunar far horizon for one set.

PAO Apollo Control here. In the course of that discussion we are now up to the live action, we have switched antennas from Ascension where they have a 30 foot dish to Madrid. That big 80 footer. Let's just leave a line open and see what results.

SC Houston. The cryos have been stirred and could you also give me a quick rundown on how the SPS align temps are doing?

CAPCOM Roger, Bill. Understand you stirred the cryos last time we checked the SPS align temps were excellent they were nice and warm. We will give you another number right now.

SC And ... valve.

CAPCOM Apollo 8, Houston.

SC Go ahead.

CAPCOM Roger. On your SCS system your oxidizer is running 75 degrees ...

END OF TAPE

CAPCOM Apollo 8, Houston.
SC Go ahead.
CAPCOM Roger, on your SPS system, your oxidizer is running 75 degrees, fuel 74 degrees, and the PU valve between 78 and 82, depending on where we measure it, over.
SC Real good, everything really is working fine, isn't it?
CAPCOM Yes, it's moving right along, Bill.
SC Okay, see you later.
CAPCOM Adios.
PAO Okay, Apollo Control Houston, 52 hours, 33 minutes. We will just shut it down to save wear and tear on the eardrums.

END OF TAPE

PAO This is Apollo Control Houston, 53 hours, 5 minutes into the flight. The spacecraft is 171 360 odd miles from Earth. Its velocity in feet per second, 3356. We have heard from the crew in the last 20 minute time period, a rather complete medical status. They reported that Bill Anders had taken 1 marezine. They say they are all feeling all quite well now as opposed to yesterday. They also explained their sleep and rest cycle. As a general reference, the spacecraft is proceeding on sort of a nose down - in a nose down attitude, if you consider in your mind's eye, the Earth, Moon, and Sun, all on a flat plain and along with the spacecraft of course. The spacecraft is proceeding in a nose down attitude toward an intersection with the Moon and at the same time the spacecraft is rotating about 1 revolution per hour. Its has held this attitude for some time and will continue in that attitude. Here is the tape conversation we have.

SC Houston, Apollo 8.

CAPCOM Apollo 8, this is Houston.

SC I understand you want two sets on number 40, lunar near horizon. Is that right?

CAPCOM That's affirmative. Two sets on number 40, lunar near horizon.

CAPCOM Apollo 8, Houston.

SC Go ahead Houston.

CAPCOM Caused we missed you last trunion angle, Frank.

SC 21450.

CAPCOM Roger, 21450, and Paul tells me Valerie is over here and wishes Bill a happy nap.

SC Okay, thank you. Tell her that he makes us tired sometimes too, will you.

CAPCOM Roger, I will deliver this modified version of the message.

SC Thank you.

CAPCOM Apollo 8, Houston.

SC Go ahead Houston.

CAPCOM Roger, on star number 40, which you are doing now, the flight plan only calls for one set of marks. You called down two sets and it's really your choice. Only one is required. We are glad to have the data if you do a second set, over.

SC We will only do one then, if you want to. Our flight plan has been updated to request two sets. That is why I called it down.

CAPCOM Roger, one set is fine.

CAPCOM Apollo 8, Houston, we missed your last trunion.

SC Very well, I will read it to you. 21455.

CAPCOM 21455, thank you. Just a matter of interest, it is taking your voice about 1.6 seconds to get down to us.

SC (Borman) I'm a little hoarse, that's why. Okay Houston, do you want us to go back to the PTC attitude now, and start the rotisserie again?

CAPCOM That is affirmative Frank. We will have the PTC attitude for you in just a minute here.

CAPCOM Apollo 8, Houston.

SC Go ahead.

CAPCOM Roger, those PTC attitudes remain pitch 224 degrees, yaw 020 degrees. On the next page, page 239 of your flight plan, those PTC numbers should be changed to (garble).

SC Pitch 224 and yaw 20.

CAPCOM That is affirmative.

CAPCOM Apollo 8, Houston, over.

SC Go ahead Houston, Apollo 8.

CAPCOM If you have a few minutes, we would like to hear the detail crew status report from you.

SC Like what.

CAPCOM Well, like we would like to know, in the last 24 hours has anybody had any symptoms similar to Frank's. We would also like to know - you know we told you the other day to take marezine as you like. We would like to know if anybody had taken any drugs and then we would like to talk over there about sweet breads and water and such.

SC Okay, nobody has taken any other drugs. Nobody took any marezine. Nobody is sick. Bill took one of those pills, a sleep Seconal pill, last night. Everybody had breakfast this morning and ate most of their meal, meal A-day 3. What else do you want?

CAPCOM We would like to tell you to drink plenty of water. We think that your water intake may be down, when we copied your dosimeter readings. The only other thing is we were wondering how you feel, in general. We show you to have about 15 hours sleep total, Frank or Bill about 10 and Jim about the same and we were wondering just how you are feeling in general.

SC We all feel fine, we are going to fix it now so that we all have one more rest period before the LOI.

CAPCOM Roger, thank you.

SC (Borman) Happiness is bacon squares for breakfast.

CAPCOM If you don't eat them all, bring them back and we will finish them off here.

SC Okay, Houston, Apollo 8 here. I stand corrected, William had 1 marezine. He didn't tell me about it, he snuck it.

CAPCOM Roger, understand Lovell took the Marezine. Understand.

SC I asked Bill Anders and he took one when he took the - with the Lomatil, when the doctors told him to.

CAPCOM Roger, we copy that, thank you.

SC Okay, we are back on the barbeque attitude, starting PTC.

CAPCOM Roger, Apollo 8, thank you.

SC We ran the latest state vector we have through the P21 and it shows the pericynthion at 69.7 miles.

CAPCOM Yes, we were all having a big talk about that down here. It looks like you are giving us a real good comparison on our system. Looking extremely good.

SC We've got the navigator, platters and launchers.

CAPCOM I believe it.

CAPCOM Apollo 8, Houston.

SC Go ahead.

CAPCOM What was the time you used on that P21?

SC 6910 there, Mr. Sliderule.

CAPCOM Thank you.

SC Mike, I wonder if Buz wants us to change the time.

CAPCOM No, that is fine.

SC Oh, okay, thank you.

SC Houston, Apollo 8.

CAPCOM Apollo 8, Houston

SC Roger, are you going to give us an update for a maneuver PC plus 2 that does not assume a flyby maneuver.

CAPCOM Roger, standby.

CAPCOM Apollo 8, Houston.

SC Go ahead Houston, Apollo 8 here.

CAPCOM Roger. Here is a rather brief summary of the updates that you will be getting. The one that you have now for PC plus 2, following a LOI minus 8 flyby maneuver, is still good. That will not be updated. The next update you will get will be MCC 4. After that, you will get 2 PC plus 2 maneuvers, that assume MCC 4 completed. One will be a minimum Delta-V and the other will be a fast return. Do you copy?

SC Roger, understand and also I take it for MCC 4 you are going to give us a new alignment. Is that correct?

CAPCOM Affirmative.

PAO Apollo Control here. That was Jim Lovell who came back with that snappy line, "happiness is having bacon cubes for breakfast." Our present distance 171 699 miles velocity in feet per second 3349. An update on the passage into the lunar gravitational field, that event to occur at